

## Claims

1. Procedure for the collection of free methane gas from the sea bottom, characterized by means of that, in a first operation takes place the free methane collection from the sea bottom and it is directed up wards, to a running section of methane gas together with sea water and forms a mixture of methane gas and sea water. The displacement of mixture is being done under the form of a current tube until a room in which takes place the separation phase, in which the mixture overflows, at an inferior sea level, where the pressure is smaller then that from the sea bottom and where takes place a distribution/gravitational spreading of it on a big surface, on which the running is done at a lower pressure, to p ermit t he separation o f methane gas from water, the humid methane gas being collected at the superior part of the room, and the sea water freely running to an inferior level from where, in the following operation, is sucked and evacuated back in the sea to ensure the required level of difference for mixture's rising, and in the following operation the humid methane gas, captured at the superior part of the room, being sucked to an other room, where it is cooled to produce the condensation of last sea water fraction, operation after which is obtained sea water in liquid state, which is collected and then is evacuated and dry methane gas, in the following operation, proceeds to the cooling of this gas at a required temperature for it to pass in the liquid state.
2. Procedure for t he collection of free methane gas from the sea bottom, in an other version of realization, characterized by means of that, in a first operation, the humid methane gas brought to the sea surface, is cooled in a room by bringing it in contact with cool methane gas and by mixing it with that, due to the temperature lowering takes place the condensation of the last fraction of sea water vapors and obtaining of the dry methane gas, the operation followed by its compression in a first step, up to a certain pressure and temperature, after which, in an other operation, is cooled at the seawater temperature, after which takes place a second step of compression followed by a new cooling at the sea water temperature and of the third step of compression, an a last operation the methane gas is discharged followed by this last compression and

sent towards a room where, after the lamination followed by an adiabatic expansion passes from the gaseous phase into the liquid phase. In parallel with the above operation takes place another process in which part from compressed methane gas in first step is taken for producing the suction of liquid methane obtained, according to the last operation, suction after which the compressed and warm methane gas from the first step of compression is mixed with the liquid methane and is discharged into a room in which takes place a first cooling of methane gas arrived as a result of its water separation operation.

3. Installation for free methane gas collection from the sea bottom, characterized by means of that, in a first realization operation, is constituted from some guiding arms **A** in a crosswise position, on which are sitting an intermediary platform **B**, destined to support some electrical reversible trolleys **D** and **E** used for displacement on vertical and radial direction of a flexible or telescopic conduit **21** and of some collectors **K** of some electrical reversible and double trolleys **F** with the help of which some separators **L** and a flexible conduit **50** can be driven on a radial direction, and conduit **50** can be driven on radial direction, and conduit **50** is kept in its horizontal position by some floating caissons **51** as well and of some electrical reversible and double trolleys **G** used to modify the position of some lateral anchors **7** and an inferior platform **C** destined for supporting together with platform **B** of components of a technological line **H** or **Q** and a superior platform **6** for alight or take-off of helicopter, some sloping portion of arms **A** serving for installing mentioned platforms **B**, **C** and **6** and the superior ends of them being rigidly assembled and supporting a hoist **4** for stiffing of a central anchor **5**.
4. Apparatus for free methane gas collection from the sea bottom, according to the claim 2, characterized by means of that, under of arm **A** is placed a separator **L** connected at its inferior part through a conduit **21** to the collector **K** and on platform **B** and **C** are placed accordingly the separators **L** and connected with them by intermediary of flexible conduit **50** the mentioned technological lines **H** or **Q**.
5. Apparatus for collection of free methane gas from the sea bottom, according to the claim 2 characterized by means of that, the guiding arms **A** are provided with some horizontal portions **1** supported by some floating casings **2**, at the exterior ends of

each from arms **A** being located some propellers **8, 9, 10** and **11** so that at their putting in operation to produce a couple which to rotate the apparatus, according to the invention, around a vertical axis, materialized by rope of central anchor **5**, the stiffness of mentioned arms **A** being done with the help of some ropes **12** stretched between the exterior ends of horizontal portion **1**.

6. Apparatus for collection of free methane gas from the sea bottom, according to the claim 2, characterized by means of that the platform **B** and **C** have an octagonal form are provided with some openings **a** and respectively **b**.
7. Apparatus for collection of free methane gas from the sea bottom, according to the claim 2, characterized by means of that, each from water separators **L** is provided with a parallelepiped body **39** closed at its superior part with a cover **40** and sitting on a platform **45** supported by some floating cassias **46**, in interior being positioned an horizontal plate **44** which delimits some rooms **c** and **d** and on which are installed a sleeve for overflow **43** connected at its inferior end with conduit **21** and some guiding tubes **52** through which vertically is running the ropes **22** and **26** through which are supported conduit **21** and a collector **K**, and at superior part of body **39** being installed some screens **41** and **42**, on the same platform **45** being positioned and some pumps **47**, and the connection of separator **L** is done by some ropes **48**. The positioning of collector **K** close to the sea bottom is done with some legs **49**.
8. Apparatus for collection of free methane gas from the sea bottom, according to the claim 2, characterized by means of that, each from the technological lines is provided with an humidity extractor **M** connected at its base with conduit **50** and from which is eliminated the condense from the methane gas, and at superior part by the conduit **60** the dry methane gas passes towards a methane gas liquidifier **N** from which is running, in the liquid state, through conduit **66** in a storage tank **O**, a nitrogen-compressor **70** discharging the nitrogen gas through the expanded valve **f** towards a liquid nitrogen tank **P** from where the nitrogen is running towards some serpentine **62** and **55** of liquefactor **N** and respectively extractor **M** and turbocompressor **70** being driven by a gas turbine **71** which is driving also an electric generator **4**.
9. Apparatus for collection of free methane gas from the sea bottom, according to the claim 2, characterized by means of that, the electrical reversible trolleys **D, E, F** and

**G** are provided with some ropes **13, 14, 22, 26, 31** and **36** supported and guided with the help of some rolls **15, 16, 17, 18, 19, 20, 23, 24, 25, 27, 28, 29, 30, 32, 33, 34** and **35** and of a block of rolls **J**.

10. Apparatus for collection of free methane gas from the sea bottom, characterized by means of that, in an other version of realization, is provided with a technological line **Q** equipped with an extractor of humidity **R** connected through conduit **53** to the separator **L** situated on platform **C** and connected through a conduit **86** at some turbocompressor **S, T** and **U** installed on the same axis of a gas turbine **W** which is coupled with an air compressor **Z** and with an electrical generator **84**, between turbocompressor **S, T** and **U** being inserted some coolers **g** and **h** , the turbocompressor **U** being connected through a conduit **97** with a methane liquid tank **V** provided with a laminate valve **j** , between the extractor **R** and the tank **V** being placed an ejector **m** in which the suction is realized through a conduit **107** trough which is brought the methane gas from compressor **S** .